E-UNSAT 2016

3rd European Conference on Unsaturated Soils

Frontiers in Unsaturated Soils
12-14 September 2016, Ecole des Ponts ParisTech, Paris

Detailed programme

P. Delage, Y.-J. Cui, S. Ghabezloo, J.-M. Pereira, A.-M. Tang
The 3rd European Conference on Unsaturated Soils

- is run under the auspices of the
  Technical Committee 106 on Unsaturated Soils of the
  International Society of Soil Mechanics and Geotechnical Engineering

- is supported by the following organisations

École nationale des ponts et chaussées

Comité français de mécanique des sols et de géotechnique

Laboratoire d’excellence MMCD
Multi-Scale Modelling & Experimentation of Materials for Sustainable Construction

- welcomes

The Silver sponsor

The Exhibitors
MARCH 12, 2016

Plenary Session
08h00 – 10h35 – Amphi Cauchy

08:00 - 08:30  Registration

08:30 - 09:00  Opening Ceremony

European Distinguished Lecture
09:00 - 9:45  Unsaturated railway track-bed materials
Yujun Cui, Ecole des Ponts ParisTech, France

Plenary Lecture
9:45 - 10:10  Effective stress and energetics of unsaturated soils
Nasser Khalili, University of New South Wales, Sydney, Australia

Plenary Lecture
9:10 - 10:35  Transient boundary conditions in the frame of THM-processes at nuclear waste repositories
Tom Schanz, Ruhr-Universität Bochum, Germany

Coffee Break (Hall) 10h35 – 11h00
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
</table>
| 11:00 - 11:15 | A study on the saturation degree dependency of the seismic behaviour of retaining walls  
                      Ghassem Habibagahi, Shiraz University, Iran |
| 11:15 - 11:30 | Study on vertical permeability regularity and collapsibility of a large thickness loess foundation by in-situ testing  
                      Huang Xue-feng, LEU Chongqing, China |
| 11:30 - 11:45 | Experimental study on the coefficient of lateral earth pressure in unsaturated soils  
                      Ali Pirjalili, Tarbiat Modares University, Iran |
| 11:45 - 12:00 | Bearing capacity of strip footings on unsaturated soils by the slip line theory  
                      Thanh Vo, The University of New South Wales, Sydney, Australia |
| 12:00 - 12:15 | Numerical analysis of an energy pile under different boundary conditions and thermal loading cycles  
                      Ali Khosravi, Sharif University of Technology, Iran |
| 12:15 - 12:30 | Effect of plastic soil on a retaining wall subjected to surcharge loading  
                      Khawla Al-Juari, University of Mossoul, Irak |

**Lunch (Restaurant)**

12:30 – 14:00
### Parallel session 11h00 – 12h30 – Amphi Cauchy

#### Microstructure

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
<th>Speaker</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:00 - 11:15</td>
<td>Macro-microscopic one-dimensional compression of wet granular soils by experimental investigation</td>
<td>Vinh Du Than</td>
<td>Ecole des Ponts ParisTech, France</td>
</tr>
<tr>
<td>11:15 - 11:30</td>
<td>Grain scale mechanisms for capillary collapse in a loose unsaturated pyroclastic soil</td>
<td>Sabatino Cuomo</td>
<td>University of Salerno, Italy</td>
</tr>
<tr>
<td>11:30 - 11:45</td>
<td>Microstructure analysis of laboratory and in-situ compacted silts</td>
<td>Giacomo Russo</td>
<td>University of Cassino and Southern Lazio, Italy</td>
</tr>
<tr>
<td>11:45 - 12:00</td>
<td>Effect of pore-size distribution on the collapse behaviour of anthropogenic sandy soil deposits</td>
<td>Wiebke Baille</td>
<td>Ruhr-Universität Bochum, Germany</td>
</tr>
<tr>
<td>12:00 - 12:15</td>
<td>Sample size choices for XRCT scanning of highly unsaturated soil mixtures</td>
<td>Charles Augarde</td>
<td>Durham University, UK</td>
</tr>
<tr>
<td>12:15 - 12:30</td>
<td>A microstructure insight into the water retention properties of the Callovo-Oxfordian claystone</td>
<td>Hamza Menaceur</td>
<td>Ecole des Ponts ParisTech, France</td>
</tr>
</tbody>
</table>

### Lunch (Restaurant) 12h30 – 14h00
Parallel session  11h00 – 12h30 – Amphi Navier

Thermal and chemical effects

11:00 - 11:15  Study of the influence of the saline solution NaCl on the potential collapse of soil
Abbeche Khelifa, Université de Batna, Algeria

11:15 - 11:30  Vapor intrusion in soils with multimodal pore-size distribution
Miguel Soto, Universidade Estadual Paulista, Brazil

11:30 - 11:45  Seasonal thermal energy storage in shallow geothermal systems: thermal equilibrium stage
Hossein Nowamooz, INSA de Strasbourg, France

11:45 - 12:00  Effect of temperature on volume change behaviour of statically compacted kaolin clay
Ogechi Chinonye Mary Ileme, Heriot-Watt University, Edinburgh, UK

12:00 - 12:15  Exploring ice content on partially saturated frozen soils using dielectric permittivity and bulk electrical conductivity measurements
Enrique Romero, Universitat Politècnica de Catalunya, Barcelona, Spain

12:15 - 12:30  Modelling the effects of pore-water chemistry on the behaviour of unsaturated clays
Henry Wong, Université de Lyon, France

Lunch (Restaurant)  12h30 – 14h00
Parallel sessions 14h00 – 14h20

**Invited Lecture – Amphi Bienvenüe**

14:00 - 14:20
Modelling an in-situ ventilation test in the Andra Underground Research Facilities
*Frédéric Collin, Université de Liège, Belgium*

**Invited Lecture – Amphi Cauchy**

14:00 - 14:20
Advances in the monitoring of geo-structure subjected to climate loading
*Alessandro Tarantino, University of Strathclyde, UK*

**Invited Lecture – Amphi Navier**

14:00 - 14:20
Fabric and clay activity in soil water retention behaviour
*Cristina Jommi, Delft University of Technology, The Netherlands*
### Parallel session

**Numerical modelling**

<table>
<thead>
<tr>
<th>Time</th>
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</tr>
</thead>
<tbody>
<tr>
<td>14:20</td>
<td>Probabilistic assessment of Precipitation-Triggered Landslides: The Role of Vegetation</td>
<td>Estefanía Muñoz, Universidade de Brasília, Brazil</td>
</tr>
<tr>
<td>14:35</td>
<td>Seismic response of earth dams considering dynamic properties of unsaturated zone</td>
<td>Mahboobeh Ariyan, Shiraz University, Iran</td>
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<tr>
<td>14:50</td>
<td>The impact of soil suction variation on earthquake intensity indices</td>
<td>Mahroosh Biglari, Razi University, Iran</td>
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<tr>
<td>15:05</td>
<td>Soil-atmosphere interaction in unsaturated cut slopes</td>
<td>Aikaterini Tsipamposi, Imperial College London, UK</td>
</tr>
<tr>
<td>15:20</td>
<td>Some Experience in Numerical Modelling of Unsaturated Landslide Instabilities</td>
<td>Josif Josifovski, Ss. Cyril and Methodius University, Skopje, Macedonia</td>
</tr>
<tr>
<td>15:35</td>
<td>Modelling desiccation cracking in a homogenous soil clay layer: comparison between different hypotheses on constitutive behaviour</td>
<td>Cristina Jommi, Delft University of Technology, The Netherlands</td>
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**Coffee break (Hall)**

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<tr>
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<tbody>
<tr>
<td>16:20</td>
<td>Shakedown modeling of unsaturated expansive soils subjected to wetting and drying cycles</td>
<td>Hossein Nowamooz, INSA de Strasbourg, France</td>
</tr>
<tr>
<td>16:35</td>
<td>Investigation into the isotropic compression of wet granular soils using discrete element method</td>
<td>Vinh Du Than, Ecole des Ponts ParisTech, France</td>
</tr>
<tr>
<td>16:50</td>
<td>Numerical modelling of desiccation cracking of clayey soil</td>
<td>Thi Dong Vo, Ecole des Ponts ParisTech, France</td>
</tr>
<tr>
<td>17:05</td>
<td>Propagation of cohesive crack in unsaturated porous media by use of XFEM method</td>
<td>Behrouz Gatmiri, University of Tehran, Iran</td>
</tr>
<tr>
<td>17:20</td>
<td>Simple Numerical Model to Simulate Penetration Testing in Unsaturated Soils</td>
<td>Majid Ghayoomi, University of New Hampshire, UK</td>
</tr>
<tr>
<td>17:35</td>
<td>Inverse analysis of cyclic constitutive models for unsaturated soil under consideration of oscillating functions</td>
<td>Muyiwa Alalade, Bauhaus University, Germany</td>
</tr>
<tr>
<td>17:50</td>
<td>Effect of Hydraulic Hysteresis on Dynamic Response of Unsaturated Soils</td>
<td>Babak Shahbodaghikhani, The University of New South Wales, Sydney, Australia</td>
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**Welcome reception**
# Advances in experimental methods: Mechanical properties

<table>
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<tr>
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<tbody>
<tr>
<td>14:20</td>
<td>Suction-controlled dynamic simple shear apparatus for measurement of</td>
<td>Majid Ghayoomi, University of New Hampshire, UK</td>
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<tr>
<td>14:35</td>
<td>dynamic properties of unsaturated soils</td>
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<tr>
<td>14:35</td>
<td>Optimisation of in-situ dry density estimation</td>
<td>Mathilde Morvan, Université Blaise Pascal, Clermont-Ferrand, France</td>
</tr>
<tr>
<td>14:50</td>
<td>Effect of particle size on the measurement of the apparent contact angle</td>
<td>Yunesh Saulick, The University of Hong Kong, SAR China</td>
</tr>
<tr>
<td>15:05</td>
<td>Characterization of the secondary swelling of compacted Maryland clay</td>
<td>Olivier Buzzi, The University of Newcastle, Australia</td>
</tr>
<tr>
<td>15:20</td>
<td>Interpreting measurements of small strain elastic shear modulus under</td>
<td>Simon Wheeler, University of Glasgow, UK</td>
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<tr>
<td>15:35</td>
<td>unsaturated conditions</td>
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<tr>
<td>15:50</td>
<td>Low-cost alternatives to estimate unsaturated soil shear strength parameters</td>
<td>Michael Bardanis, EDAFOS Engineering Consultants S.A., Greece</td>
</tr>
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</table>

## Coffee break (Hall)

<table>
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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>16:20</td>
<td>The cone penetration test in unsaturated silty sands</td>
<td>Hongwei Yang, The University of Hong Kong, SAR China</td>
</tr>
<tr>
<td>16:35</td>
<td>Thermal volume change of unsaturated silt under different stress states and suction magnitudes</td>
<td>John McCartney, University of California San Diego, USA</td>
</tr>
<tr>
<td>16:50</td>
<td>Stress path during pressuremeter test and link between shear modulus and</td>
<td>Vincent Savatier, EGIS Géotechnique, Seyssins, France</td>
</tr>
<tr>
<td>17:05</td>
<td>Ménard pressuremeter modulus in unsaturated fine soils</td>
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<tr>
<td>17:05</td>
<td>The influence of saturation on the cracking process in compacted desiccating clays</td>
<td>Maria Noack, Bauhaus-Universität Weimar, Germany</td>
</tr>
<tr>
<td>17:20</td>
<td>Characterization of compacted silty sand via relative humidity-controlled triaxial testing</td>
<td>Laureano R. Hoyos, University of Texas at Arlington, USA</td>
</tr>
<tr>
<td>17:35</td>
<td>Reconciling soil-water retention properties and shear strength parameters of compacted clayey soils via suction-controlled ring shear testing</td>
<td>Laureano R. Hoyos, University of Texas at Arlington, USA</td>
</tr>
<tr>
<td>17:50</td>
<td>IPI laboratory tests - experimental and numerical approach</td>
<td>Dino Mahmutovic, EGIS Géotechnique, Seyssins, France</td>
</tr>
</tbody>
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**Welcome reception**
Parallel session  
14h20 – 18h00 – Amphi Navier

Water retention properties

14:20 - 14:35  Analytical reliability analysis of soil-water characteristic curve  
Ali Johari, Shiraz University of Technology, Iran

14:35 - 14:50  Influence of structure in the soil-water characteristic curves of two residual soils of granite  
Marcelo Heidemann, Federal University of Santa Catarina, Brazil

14:50 - 15:05  Effect of in situ and laboratory compaction on the retention behaviour of a clayey soil  
Francesca D’Onza, Italian National Agency for new technologies, Energy and sustainable economic development, Italy

15:05 - 15:20  Experimental determination of the hysteretic behaviour of soil-water retention curve of silty sands  
Ludwig Angerer, TU München, Germany

15:20 - 15:35  Modelling of the water retention characteristic of deformable soils  
Yu Wang, University of Salford, UK

15:35 - 15:50  Estimation of water retention behaviour of MX-80 bentonite partially saturated with saline solution  
Wojciech Solowski, Aalto University, Helsinki, Finland

Coffee break (Hall)  
15h50 – 16h20

16:20 - 16:35  A theoretical retention model for unsaturated uniform and graded soils  
Jacques Monnet, GAIATECH, Grenoble, France

16:35 - 16:50  Comparison of soil water retention curves for sandy clay, obtained using different laboratory testing methods  
Piotr Osinski, Warsaw University of Life Sciences, Poland

16:50 - 17:05  Classification, soil-water characteristic curve and swelling/collapse behaviour of the Nicosia marl, Cyprus  
Dimitrios Loukidis, University of Cyprus

17:05 - 17:20  A void ratio dependent water retention curve model including hydraulic hysteresis  
Amin Pasha, University of New South Wales, Sydney, Australia

17:20 - 17:35  Water repellent soils: The case for unsaturated soil mechanics  
Chris Beckett, The University of Western Australia, Perth

17:35 - 17:50  Water retention behaviour of compacted bentonites: experimental observations and constitutive model  
Robert Charlier, Université de Liège, Belgium

17:50 - 18:05  Aggregate size effect on the water retention properties of a lime-treated compacted silt during curing  
Yejiao Wang, Ecole des Ponts ParisTech, France

Welcome reception
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<th>Time</th>
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</table>
| 09:00 - 09:45 | Keynote Lecture | Investigation on chemical effects on GMZ bentonite used as buffer materials  
Wei-Min Ye, Tongji University, Shanghai, China |
| 09:45 - 10:10 | Plenary Lecture | Challenges in treating earthen construction materials as unsaturated soils  
Charles E. Augarde, Durham University, UK |
| 10:10 - 10:35 | Plenary Lecture | Modelling suction instabilities in soils at varying degrees of saturation  
Giuseppe Buscarnera, Northwestern University, Evanston, USA |

Coffee break (Hall)  
10:35 – 11:00
Parallel session 11h00 – 12h30 – Amphi Bienvenüe

**Numerical modelling**

11:00 - 11:15 An XFEM Model for Hydraulic Fracturing in Partially Saturated Rocks  
Saeed Salimzadeh, Imperial College London, UK

11:15 - 11:30 Experimental and numerical approaches of the hydro-mechanical behavior of quasi-saturated compacted clayey soil  
Zhong-Sen LI, Centrale-Supélec, France

11:30 - 11:45 Elastoplastic model for unsaturated, quasi-saturated and fully saturated fine soils  
Antonin Fabbri, Université de Lyon, France

11:45 - 12:00 The determination of model dimension for an embankment to study soil atmosphere interaction with Finite Element Method  
Ni An, Ecole des Ponts ParisTech, France

12:00 - 12:15 Analysis of passive earth thrust in an unsaturated sandy soil using discontinuity layout optimization  
Bestun Shwan, University of Sheffield, UK

12:15 - 12:30 Modelling large deformation problems in unsaturated soils  
Eduardo Alonso, Universitat Politècnica de Catalunya, Barcelona, Spain

*Lunch (Restaurant)* 12h30 – 14h00
Parallel session 11h00 – 12h30 – Amphet Cauchy

Soil-vegetation-atmosphere interactions

11:00 - 11:15 On the mechanisms and kinetics of evaporation of a compacted silt
Régis Mpawenayo, Université libre de Bruxelles, Belgium

11:15 - 11:30 Implications of the atmosphere-soil interaction for the design of earth retaining structures
Juan Carlos Ruge, Universidad Nacional de Colombia, Bogota

11:30 - 11:45 Effect of wetting-drying cycles on soil desiccation cracking behaviour
Chao-Sheng Tang, Nanjing University, China

11:45 - 12:00 Evaluation of the effect of Land Vegetation Cover on water and energy balance of an unsaturated pyroclastic cover
Alfredo Reder, Università di Napoli Federico II, Italy

12:00 - 12:15 Description of a field test involving cracking in a drying soil
Alberto Ledesma, Universitat Politècnica de Catalunya, Barcelona, Spain

12:15 - 12:30 Correlating hydro-mechanical properties of vegetated soil with leaf functional traits
David Boldrin, University of Dundee, UK

Lunch (Restaurant) 12h30 – 14h00
**Parallel session**

**Environmental Geotechnics (with TC215)**

11:00 - 11:15  
Influence of atmospheric conditions on the strength of unstabilized earthen constructions  
_Pierre Gérard, Université libre de Bruxelles, Belgium_

11:15 - 11:30  
Improved climatic chamber for desiccation simulation  
_Catalina Lozada, Universidad de los Andes, Bogota, Colombia_

11:30 - 11:45  
Aging effect on swell, shrinkage and flexural strength of sand and waste marble powder stabilized expansive soil  
_Serife Oncu, Eastern Mediterranean University, North Cyprus_

11:45 - 12:00  
Feasibility study of a new unsaturated three-layer landfill cover system  
_Jason Coo, Hong Kong University of Science and Technology, SAR China_

12:00 - 12:15  
Experimental study of gas breakthrough and emission in an unsaturated clay landfill cover  
_Zhongkui Chen, Hong Kong University of Science and Technology, SAR China_

12:15 - 12:30  
Testing surfactants as additives for clay improvement: compaction and suction effects  
_Sergio Lourenco, The University of Hong Kong, SAR China_

**Lunch (Restaurant)**

12h30 – 14h00
Parallel sessions 14h00 – 14h20

Invited Lecture – Amphi Bienvenüe
SEALEX in-situ experiments-performance tests of repository seals: experimental observations and modelling
Nadia Mokni, Institut for Radiation Protection and Nuclear Safety, Fontenay, France
14:00 - 14:20

Invited Lecture – Amphi Cauchy
Indirect determination of soil water content
Philippe Cosenza, Université de Poitiers, France
14:00 - 14:20

Invited Lecture – Amphi Navier
Infiltration-induced Slope Instability: a multi-scale approach
Francesca Casini, Università di Roma Tor Vergata, Italy
14:00 - 14:20
Parallel session 14h20 – 18h05 – Amphi Bienvenüe

Mechanical properties

14:20 - 14:35  Study of the microstructure of a collapsible soil flooded with NaCl saline
               Bahloul Ouassila, Université de Batna, Algeria

14:35 - 14:50  Influence of saturation degree and role of suction on unsaturated soils behavior :
               Application to liquefaction
               Mathilde Vernay, Université Blaise Pascal, Clermont-Ferrand, France

14:50 - 15:05  Effects of loading frequency on cyclic parameters of unsaturated Zenoz kaolin
               Mohsen Mojezi, Razi University, Iran

15:05 - 15:20  Effect of very high compaction pressures on the physical and mechanical
               properties of earthen materials
               Agostino W. Bruno, Université de Pau et des Pays de l’Adour, Anglet, France

15:20 - 15:35  Stabilization of an expansive soil from Sergipe - Brazil
               Erinaldo Cavalcante, Universidade Federal de Sergipe, Brazil

15:35 - 15:50  Unconfined strength of an unsaturated residual soil struck by replicated lightning
               Thiago Carnavale, Pontifical Catholic University of Rio de Janeiro, Brazil

Coffee break (Hall) 15h50 – 16h20

16:20 - 16:35  Experimental study of the hydro-mechanical behavior of unsaturated argillaceous rocks
               Jairo Martín Espitia López, Universidad de los Andes, Bogota, Colombia

16:35 - 16:50  Rheology of wet granular materials in slow shear : experiments and discrete numerical simulations
               Michel Badetti, Université Paris-Est, Laboratoire Navier, Marne la Vallée, France

16:50 - 17:05  Settlements in unsaturated granular soil induced by changes in saturation and suction
               Marius Milatz, Hamburg University of Technology, Germany

17:05 - 17:20  Relating shear strength of unsaturated soils with capillary water retention curve
               Annan Zhou, RMIT University, Melbourne, Australia

17:20 - 17:35  Evaluation of swell behavior of expansive clays from specific moisture capacity
               Alejandro Bravo, The University of Texas at Arlington, USA

17:35 - 17:50  Hydro-mechanical paths within unsaturated compacted soil framed through water retention surfaces
               Benjamin Pelizzari, Université Joseph Fourier, Grenoble, France

17:50 - 18:05  Hydromechanical behavior of a quasi-saturated compacted soils on drying-wetting
               paths- experimental and numerical approaches
               Soanarivo Rinah Andrianatrehina, Université du Havre, France

Gala dinner at “Le Train Bleu”, Gare de Lyon (upon registration) 20h00
Parallel session 14h20 – 18h05 – Amphi Cauchy

Advances in experimental methods: Hydraulic properties

14:20 - 14:35 Building the UPPA high capacity tensiometer
Joao Mendes, Université de Pau et des Pays de l’Adour, Anglet, France

14:35 - 14:50 Correspondence between the electrical resistivity and total suction in compacted kaolin considering the presence of salt
Rafaela Cardoso, Instituto Superior Técnico, University of Lisbon, Portugal

14:50 - 15:05 Study of the variation of B with Sr
Mathilde Morvan, Université Blaise Pascal, Clermont-Ferrand, France

15:05 - 15:20 Validation of a new sensor to measure the concentration of polyethylene glycol for unsaturated soil testing
Olivier Buzzi, The University of Newcastle, Australia

15:20 - 15:35 Time response of two types of porous blocks for suction measurement
Michael Bardanis, EDAFOS Engineering Consultants S.A., Greece

15:35 - 15:50 Effects of testing techniques on the SWRC of a partially saturated soil
Michael Gunn, London South Bank University, UK

Coffee break (Hall) 15h50 – 16h20

16:20 - 16:35 Investigating soil water retention characteristics at high suctions using relative humidity control
Vasileios Mantikos, Imperial College London, UK

16:35 - 16:50 Application of fitting parameters in best fit equation
Qian Zhai, Nanyang Technological University, Singapore

16:50 - 17:05 Estimation of hydraulic conductivity function in unsaturated pyroclastic soils
Marianna Pirone, Università di Napoli Federico II, Italy

17:05 - 17:20 Response of different osmotic membranes and calibration of a coupled model capturing the temperature effect for the osmotic method
Olivier Buzzi, The University of Newcastle, Australia

17:20 - 17:35 Erodibility of soil above the groundwater level: some test results
Anna Shidlovskaya, National Mineral Resources University, St Petersburg, Russia

17:35 - 17:50 Measurement of soil suction using moist filter paper
Richard Kizza, Nanyang Technological University, Singapore

17:50 - 18:05 Soil water retention behaviour for an instrumented embankment
David Toll, Durham University, UK

Gala dinner at “Le Train Bleu”, Gare de Lyon (upon registration) 20h00
Parallel session 14h20 – 18h05 – Amphi Navier

Slope Stability

14:20 - 14:35 Rainfall-induced landslides in quaternary soils in Norway
Håkon Heyerdahl, Norwegian Geotechnical Institute, Oslo, Norway

14:35 - 14:50 Effects of soil-vegetation-atmosphere interaction on the stability of a clay slope: a case study
Giuseppe Pedone, Geotechnical Consulting Group, London, UK

14:50 - 15:05 Estimation of the variation of matric suction with respect to depth in a vertical unsaturated soil trench associated with rainfall Infiltration
Won Taek Oh, University of New Brunswick, Canada

15:05 - 15:20 Effects of rainfall characteristics on the stability of tropical residual soil slope
Harianto Rahardjo, Nanyang Technological University, Singapore

15:20 - 15:35 The impact of hydrological parameters on modelling slope safety factor towards shallow landslides: a case study from Oltrepò Pavese
Massimiliano Bordoni, University of Pavia, Italy

15:35 - 15:50 Field instrumentation for performance assessment of geobarrier System
Harianto Rahardjo, Nanyang Technological University, Singapore

Coffee break (Hall) 15h50 – 16h20

16:20 - 16:35 Degree of saturation effect on the grout-soil interface shear strength of soil nailing
Qiong Wang, The University of Newcastle, Australia

16:35 - 16:50 Governing failure mode of unsaturated soil slopes under rainwater infiltration
Wengui Huang, Nanyang Technological University, Singapore

16:50 - 17:05 Analysis of rainfall triggered landslides at Rest and be Thankful in Scotland
Brunella Balzano, University of Strathclyde, UK

17:05 - 17:20 Numerical analysis of the stability of inhomogeneous slopes considering partially saturated conditions
Patrick Pichler, Graz University of Technology, Austria

17:20 - 17:35 Characteristics of failure mass and safety factor during rainfall of an unsaturated slope - Domenico Gallipoli, Université de Pau et des Pays de l’Adour, Anglet, France

17:35 - 17:50 Rainfall Seasonality Influence on Landslide Probability: A Modelling Approach
Estefanía Muñoz, Universidad Nacional de Colombia, Medellin

17:50 - 18:05 Numerical simulation of rainfall tests on small-scale slope model
Fakher Hamrouni, Ecole Nationale d’Ingénieurs de Tunis, Tunisia

Gala dinner at “Le Train Bleu”, Gare de Lyon (upon registration) 20h00
Parallel sessions

09:00 - 09:20

**Invited Lecture – Amphi Bienvenüe**
Challenges in monitoring and managing engineered slopes in a changing climate
*Paul N. Hughes, Durham University, UK*

09:00 - 09:20

**Invited Lecture – Amphi Cauchy**
Two-phase flow effects on the CO2 injection pressure evolution and implications for the caprock geomechanical stability
*Víctor Vilarrasa, École Polytechnique Fédérale de Lausanne, Switzerland*

09:00 - 09:20

**Invited Lecture – Amphi Navier**
Chemo-physical evolution and microstructure features of lime treated soils
*Giacomo Russo, University of Cassino and Southern Lazio, Italy*
Parallel session  09h20 – 12h30 – Amphitheater Bienvenue

Water transport properties

09:20 - 09:35  Simulation of water movement and its distribution in a soil column under a water source using pore-scale network modeling  
*Saeed Samadianfard, University of Tabriz, Iran*

09:35 - 09:50  On the hydrological properties of mountain soils, from measurement to the geotechnical implications  
*Stefano Barontini, Università degli Studi di Brescia, Italy*

09:50 - 10:05  Moisture migration during loading and shearing of unsaturated sand  
*Bestun Shwan, University of Sheffield, UK*

10:05 - 10:20  Volumetric water content measurement probes in earth-dam construction  
*Michael Bardanis, EDAFOS Engineering Consultants S.A., Greece*

10:20 - 10:35  Evaluation of empirical methods for estimating potential evaporation values in northeast France  
*Katia Bicalho, Federal University of Espirito Santo, Brazil*

Coffee break (Hall)  10h35 – 11h00

11:00 - 11:15  Formulation of phase-field model for multiphase flow in deformable porous media  
*Giulio Sciarra, Università di Roma La Sapienza, Italy*

11:15 - 11:30  Estimation of the empirical model parameters of unsaturated soils.  
*Salima Bouchemella, Université de Souk Ahras, Algeria*

11:30 - 11:45  A new mechanism of canopy effect in unsaturated freezing soils  
*Jidong Teng, Central South University, Changsa, China*

11:45 - 12:00  Modeling of imbibition process in an embankment scale model  
*Giada Maria Rotisciani, Università di Roma La Sapienza, Italy*

12:00 - 12:15  Numerical study on the influence of entrapped air bubbles on the time-dependent pore pressure distribution in soils due to external changes in water level  
*Georg Ausweger, Graz University of Technology, Austria*

12:15 - 12:30  Modelling of coupled heat and moisture flows around a buried electrical cable  
*Hossein Eslami, Université de Lorraine, Nancy, France*

Lunch (Restaurant)  12h30 – 14h00
Parallel session
09h20 – 12h30 – Amphi Cauchy

Constitutive modelling

09:20 - 09:35
A finite strain elastoplastic constitutive model for unsaturated soils incorporating mechanisms of compaction and hydraulic collapse
Keita Nakamura, Yokohama National University, Japan

09:35 - 09:50
Development of a coupled thermo-hydro-mechanical double structure model for expansive soils
David Masin, Charles University in Prague, Czech Republic

09:50 - 10:05
Incorporating anisotropy in the Barcelona basic model
Domenico Gallipoli, Université de Pau et des Pays de l’Adour, Anglet, France

10:05 - 10:20
Identification of potential strain heterogeneities during wetting-induced compaction
Giuseppe Buscarnera, Northwestern University, Evanston, USA

10:20 - 10:35
Plasto-damage modelling for semi-brittle geomaterials
Gatmiri Behrouz, University of Tehran, Iran

Coffee break (Hall)
10h35 – 11h00

11:00 - 11:15
An effective stress approach for hydro-mechanical coupling of unsaturated soils
Hiram Arroyo, Universidad Autónoma de Querétaro, Mexico

11:15 - 11:30
Modelling of wetting tests for a natural pyroclastic soil
Mariagiovanna Moscariello, University of Salerno, Italy

11:30 - 11:45
Fully undrained cyclic loading simulation on unsaturated soils using an elastoplastic model for unsaturated soils
Veerayut Komolvilas, Yokohama National University, Japan

11:45 - 12:00
Essential features of compacted silty sand behavior via suction-controlled triaxial testing
Laureano R. Hoyos, The University of Texas at Arlington, USA

12:00 - 12:15
A constitutive model for unsaturated soils based on a compressibility framework dependent on suction and degree of saturation
Panagiotis Sitarenios, National Technical University of Athens, Greece

12:15 - 12:30
Prediction of wetting – induced volume change behaviour of compacted unsaturated soils in the context of the MPK framework
Arunodi Abeyrathne, Monash University, Melbourne, Australia

Lunch (Restaurant)
12h30 – 14h00
Parallel session  09h20 – 12h30 – Amphi Navier

Mechanical behaviour

09:20 - 09:35
Hydro-mechanical behaviour of sandy silt under generalised stress conditions
Enrique Romero, Universitat Politècnica de Catalunya, Barcelona, Spain

09:35 - 09:50
An experimental investigation of the independent effect of suction and degree of saturation on very small-strain stiffness of unsaturated soils
Arianna Pagano, University of Strathclyde, UK

09:50 - 10:05
Influence of effective stress on swelling pressure of expansive soils
Wiebke Baille, Ruhr-Universität Bochum, Germany

10:05 - 10:20
The influence of wetting and drying paths on the shear strength of a silty clayey compacted soil
Matheus Matuella, Universidade Federal do Rio Grande do Sul, Brazil

10:20 - 10:35
Characterizing the behavior of small strain shear modulus for silt and sand during hydraulic hysteresis
Ali Khosravi, Sharif University of Technology, Iran

Coffee break (Hall)  10h35 – 11h00

11:00 - 11:15
Study on the stress path dependency of collapse behavior of Gorgan loess implementing unsaturated oedometer devices
S. Mohsen Haeri, Sharif University of Technology, Iran

11:15 - 11:30
Suction controlled drying and wetting cycle effects on the volumetric behaviour of a lime-treated high plasticity clay
Camillo Airò Farulla, University of Palermo, Italy

11:30 - 11:45
Anisotropic behaviour of compacted clayey silt subjected to hydro-mechanical paths
Enrique Romero, Universitat Politècnica de Catalunya, Barcelona, Spain

11:45 - 12:00
Predicting the volumetric variation due to changes in suction, applied stress and swelling pressure
Roberto Galaviz-González, Universidad Autónoma de Querétaro, Mexico

12:00 - 12:15
Creep response in shear of clayey geo-materials under saturated and unsaturated conditions
Nor Shahidah Mohd Nazer, University of Strathclyde, UK

12:15 - 12:30
Application of a multi-scale form of Terzaghi’s effective stress principle for unsaturated expansive clays to simulate hydro-mechanical behavior during hydration
Julia Mainka, Université de Lorraine, Nancy, France

Lunch (Restaurant)  12h30 – 14h00
Parallel session 14h00 – 15h30 – Amphi Bienvenüe

Nuclear waste disposal

14:00 - 14:15 Hydro-mechanical modelling of MX-80 bentonite: one dimensional study
Ayman Abed, Aalto University, Helsinki, Finland

14:15 - 14:30 Investigation of creep behavior of a compacted bentonite using suction control technique
Tomoyoshi Nishimura, Ashikaga Institute of Technology, Japan

14:30 - 14:45 Achievements of investigation on hydraulic properties of compacted GMZ bentonite using as buffer/backfill material
Weimin Ye, Tongji University, Shanghai, China

14:45 - 15:00 Stress release and suction generation in the Callovo-Oxfordian claystone
Pierre Delage, Ecole des Ponts ParisTech, France

15:00 - 15:15 Changes on the microstructure of compacted bentonite caused by heating and hydration
María Villar, Centro de Investigaciones Energéticas Medioambientales y Tecnológicas, Madrid

15:15 - 15:30 Study on GMZ bentonite-sand mixture by undrained triaxial tests
Wenjing Sun, Shanghai University, China

Coffee break (Hall) 15h30 – 16h00
### Parallel session 14h00 – 15h30 – Amphi Cauchy

#### Dams and dykes

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00 – 14:15</td>
<td>Investigation of the influence of animal burrowing on the failure of the levee of San Matteo along the Secchia river</td>
<td>Maria Luisa Taccari, Deltares, Delft University of Technology, The Netherlands</td>
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<tr>
<td>14:15 – 14:30</td>
<td>On the role of partially saturated soil strength in the stability analysis of a river embankment under steady-state and transient seepage conditions</td>
<td>Guido Gottardi, University of Bologna, Italy</td>
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<tr>
<td>14:30 – 14:45</td>
<td>Swelling and collapse of compacted soils to be used as earth dam cores</td>
<td>Michael Bardanis, EDAFOS Engineering Consultants S.A., Greece</td>
<td></td>
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<tr>
<td>14:45 – 15:00</td>
<td>Distribution of pore water pressure in an earthen dam considering unsaturated-saturated seepage analysis</td>
<td>Kumar Venkatesh, Motilal Nehru National Institute of Technology, Allahabad, India</td>
<td></td>
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<tr>
<td>15:00 – 15:15</td>
<td>Reliability analysis of flood embankments taking into account a stochastic distribution of hydraulic loading</td>
<td>Alessia Amabile, University of Strathclyde, UK</td>
<td></td>
</tr>
<tr>
<td>15:15 – 15:30</td>
<td>Conceptual considerations on evaluation of internal erosion phenomenon via no-erosion filter test and continuing erosion filter test</td>
<td>Johnatan Ramos Rivera, National University of Colombia</td>
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</tr>
</tbody>
</table>

### Coffee break (Hall) 15h30 – 16h00
Parallel session 14h00 – 15h30 – Amphi Navier

Transportation infrastructures

14:00 - 14:15  Behavior of railroads on shrink-swell soils  
Marcelo Sanchez, Texas A&M University, College Station, USA

14:15 - 14:30  Study of chemical-mineralogical properties of modified soils with polymers addition  
Jonny Patricio, Universidade Federal de Campina Grande, Brazil

14:30 - 14:45  Experiences from in-situ monitoring of pavement under weather conditions change  
Barbara Likar, Zavod za gradbeništvo Slovenije, Ljubljana, Slovenia

14:45 - 15:00  A site assessment of pavement cracking in a drought environment: a case study  
James Nevels, Geotechnical Consultant, Norman, USA

15:00 - 15:15  Water balance of an earth fill built of organic clay  
Emanuel Birle, TU München, Germany

15:15 - 15:30  Modelling of unsaturated granular materials in flexible pavements  
Fan Gu, Texas A&M University, College Station, USA

Coffee break (Hall) 15h30 – 16h00
Plenary session 16h00 – 18h00 – Amphi Cauchy

Plenary Lecture
16:00 - 16:25
Inputs from in situ experiments to the understanding of the unsaturated behaviour of Callovo-Oxfordian claystone
Gilles Armand, Agence Nationale pour la Gestion des Déchets Radioactifs, Bure, France

Plenary Lecture
16:25 - 16:50
Cracking in desiccating soils
Alberto Ledesma, Universitat Politècnica de Catalunya, Barcelona, Spain

Keynote Lecture
16:50 - 17:35
Determination of the relationship among capillary pressure, saturation and interfacial area: a pore unit assembly approach
Majid Hassanizadeh, Utrecht University, The Netherlands

17:35 - 18:00
Closing Ceremony